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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,527	10/21/2003	Masaru Mitsui	330-270	8629

23117 7590 11/03/2005

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ARLINGTON, VA 22203

EXAMINER
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ROSASCO, STEPHEN D

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 11/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/689,527

Applicant(s)

MITSUI ET AL.

Examiner

Stephen Rosasco

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

In response to the Amendment of 9/27/05, wherein claims 6-14 were added, the examiner withdraws the rejection based on anticipation, maintains the rejection under 35 U.S.C. 103(a) and makes the action final.

Remarks – the applicant has added the limitation to the independent claims that the a gas flow rate was selected from a region where sputtering discharge voltage or discharge current does not show a substantial change with regard to a change in the reactive gas flow rate.

However, there are no limits claimed for these variables and no range specified wherein these measurements occur. It would be expected that there would be at least some nominal ranges where this relationship would be true in general. Also the limits for “substantial change” are not defined or obvious. It would be assumed that the gas flow rate, and/or other variables could be adjusted depending on the specific conditions to give the desired result, and that one in the art would know to do this.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Art Unit: 1756

Patentability shall not be negated by the manner in which the invention was made.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki et al. (6,511,778).

The claimed invention is directed to a half-tone phase shifting mask and a process for manufacturing half-tone phase shifting mask blanks each having a phase shifting film containing at least one half-tone film on a transparent substrate, comprising the step of providing a target containing a metal and silicon, and carrying out reactive sputtering in an atmosphere containing a reactive gas, to form said half-tone film on said transparent substrate, wherein the formation of the half-tone film by said reactive sputtering is carried out using, as said target, a target having a metal/silicon composition.

The applicant discusses the limitations of the prior art in that in the optical properties of half-tone phase shifting mask blanks, conventionally, it has been required to control the transmissivity variation to be  $\pm 1\%$  and control the phase shifting amount to be  $\pm 5$  degree. In recent years, however, it has come to be required to attain a transmissivity variation of  $\pm 0.4\%$ , desirably,  $\pm 0.2\%$  and a phase shifting amount variation of  $\pm 4$  degree, desirably,  $\pm 2$  degree. With a decrease in the wavelength of an exposure beam, however, it tends to be still more difficult to control the above variations to be in the above tolerable ranges. When the above various kinds of half-tone phase shifting mask blanks having various optical properties are manufactured with one mass-production apparatus, it has

been difficult to set film-forming conditions under which the optical properties do not vary with regard to the optical properties of each kind.

Okazaki et al. teach a method of manufacturing a phase shift mask, comprising the steps of: forming a phase shifter composed primarily of a fluorine-doped metal silicide comprising a fluorine-doped chromium silicide, fluorine-doped molybdenum silicide or fluorine-doped gadolinium gallium silicide, and at least one element of oxygen, nitrogen or carbon, on a substrate transparent to exposure light using a sputtering technique wherein the sputtering is carried out using chromium silicide, molybdenum silicide or gadolinium gallium silicide as the target, and using  $\text{SiF}_4$ ,  $\text{CF}_4$  or  $\text{NF}_3$  as the reactive gas, lithographically forming a resist pattern on the phase shifter, and patterning the phase shifter by dry etching or wet etching through the resist pattern.

And wherein in the step of forming a phase shifter, sputtering is carried out using chromium, molybdenum or gadolinium gallium as the target, and using  $\text{SiF}_4$  as the reactive gas.

And wherein in the step of forming a phase shifter, sputtering is carried out by reactive sputtering using a mixed gas composed of an element source gas which supplies an element selected from among oxygen, nitrogen and carbon in admixture with an inert gas and a reactive gas.

The teachings of Okazaki et al. differ from those of the applicant in that the applicant teaches that the flow rate can be changed to stabilize the layer.

Art Unit: 1756

However, Okazaki et al. also teach (col. 6, lines 1-16) that the element source gas can be used at a flow rate such that the element ratio of the element thus supplied relative to the inert gas is 1 to 40% for oxygen, 1 to 20% for nitrogen, and 1 to 10% for carbon. A relatively small amount of the gas used in reactive sputtering is capable of changing the refractive index of the shifter film.

Therefore, it would have been obvious to one having ordinary skill in the art to take the teachings of Okazaki et al. and adjust the flow rate to give the desired optical properties in order to make the claimed invention because it would be obvious from the prior art teachings to adjust the flow rate to give the desired composition and the related optical properties.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will

Art Unit: 1756

the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'S. Rosasco', with a stylized, sweeping line extending from the left side.

S. Rosasco  
Primary Examiner  
Art Unit 1756

S. Rosasco  
10/31/05